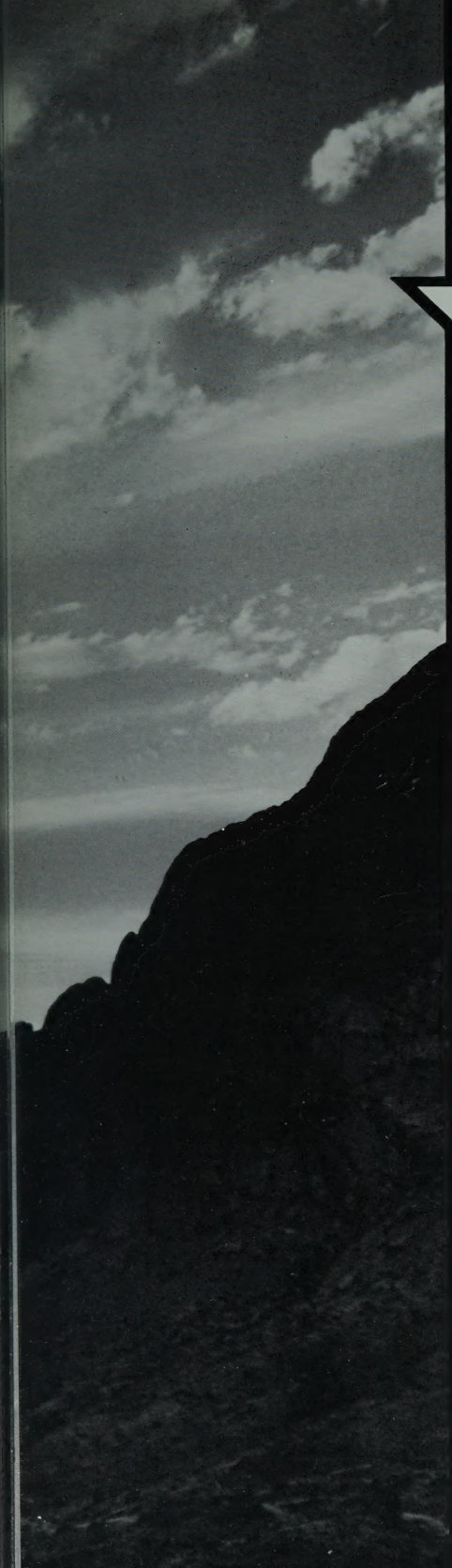
Texas Highways

January 1964



Texas Highways

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Volume II • Number 1

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About Our Cover
Just a touch of snow was needed to turn the world to a winter wonderland on this small country road just off S.H. 71 west of Austin.

Inside Front
This dramatic scene of The Window in Big Bend National Park seems to symbolize the dawn of a New Year. Hal Stegman took the picture from the floor of the Basin in the Chisos Mountains.

Editorial .....

What Kind of Salesmen Are We?

Last month we discussed the refreshing, inspirational message delivered at the 37th annual Highway Short Course by Highway Commission Chairman Herbert C. Petry Jr.

Space limitations kept us from adding comments on the remarks of Commissioner Jack H. Kultgen, who discussed a few ideas that engender considerable reflection.

Mr. Kultgen pointed to the outstanding Texas High way system. As the newest member of the Commission he described his appearance before the Departmental engineers and technical specialists as similar to a "freshman among upperclassmen."

He gave credit to the dedicated, career employes of the Department for building the nation's finest highway system. Yet, he warned that the work of the Department does not end with providing a smooth riding surface for the state's motorists.

"You are salesmen and you must constantly be selling yourself and your product," Mr. Kultgen declared. He added: "I call this to your attention because I am salesminded myself."

Mr. Kultgen pointed out that although Texas highways may rank among the best in the nation, we cannot sit back and rest on past deeds. We must constantly keep abreast of ever-improving materials, equipment and design and construction procedures.

Even there, Departmental responsibilities do not end. We must keep the public—the highway users—informed of the value of new highway designs and devices to their safety, comfort and conveniences.

Mr. Kultgen described it as a "humbling experience" to serve on the Highway Commission. He paid tribute to those who have contributed so much vision to building the present system. But he stressed that the public must be kept advised—constantly—of the need for the best possible highway program.

Automobile designers spend millions of dollars each year building bigger, faster, heavier vehicles. Texas Highway Department engineers must anticipate the needs of this ever-increasing volume of traffic, build today for the needs of 20 years from now—tomorrow.

The Department has the engineers and designers with the technical experience to meet these requirements. But what kind of "salesmen" are we? The public sees the image of the Highway Department and the highway program in each and every employe.

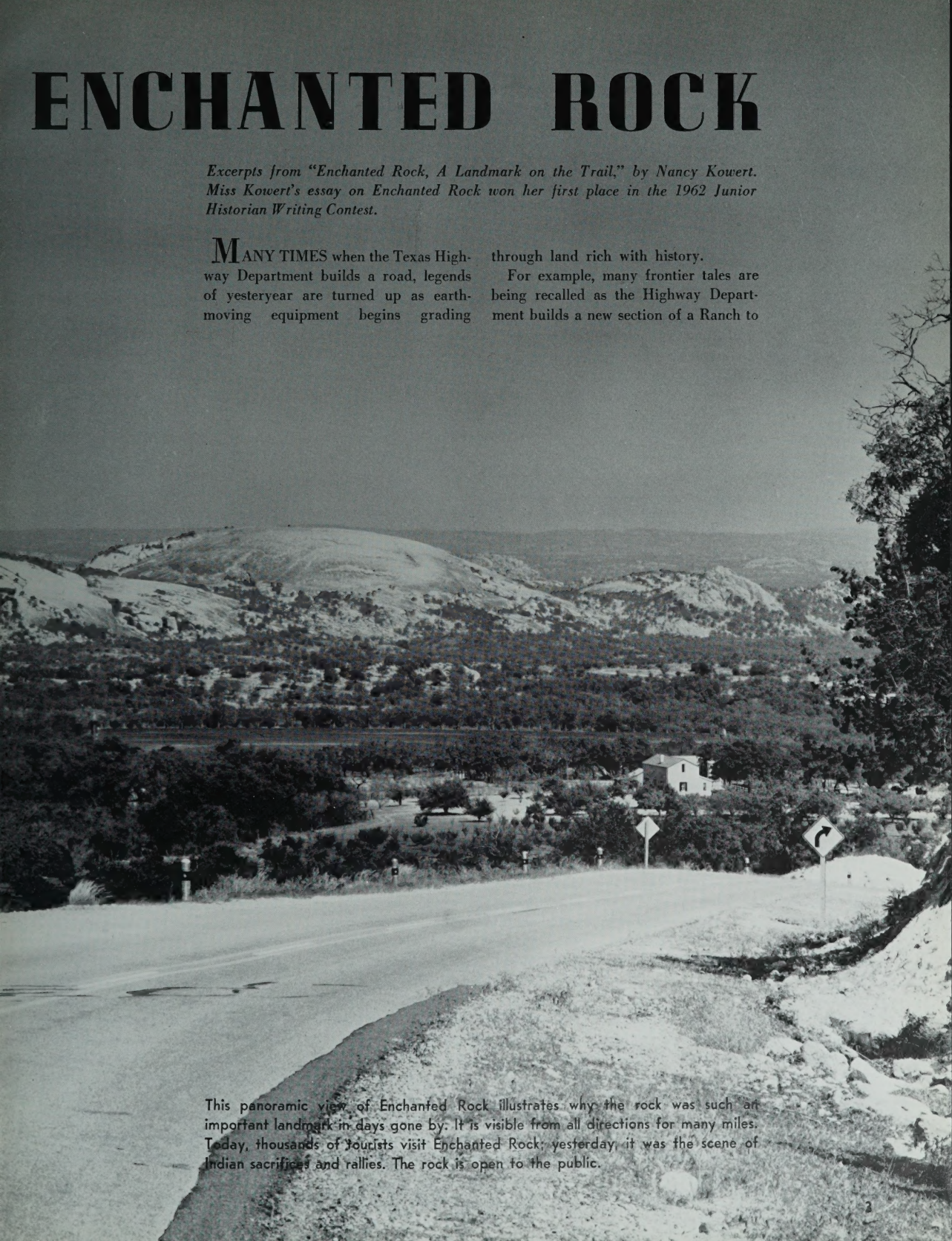
YOU are the salesman—what are you selling today?

ENCHANTED ROCK

Excerpts from "Enchanted Rock, A Landmark on the Trail," by Nancy Kowert. Miss Kowert's essay on Enchanted Rock won her first place in the 1962 Junior Historian Writing Contest.

MANY TIMES when the Texas Highway Department builds a road, legends of yesteryear are turned up as earth-moving equipment begins grading through land rich with history.

For example, many frontier tales are being recalled as the Highway Department builds a new section of a Ranch to



This panoramic view of Enchanted Rock illustrates why the rock was such an important landmark in days gone by. It is visible from all directions for many miles. Today, thousands of tourists visit Enchanted Rock; yesterday, it was the scene of Indian sacrifices and rallies. The rock is open to the public.

Construction on the new section of R.M. 965 began in October, recalling many stories and legends of Enchanted Rock. Enchanted Rock's granite is not of high enough quality for commercial use, although the many minerals which exist in the area make it an invaluable location for field trips by geology students, especially those from The University of Texas.

Market Road near one of Texas' most interesting sights: the landmark called Enchanted Rock.

Enchanted Rock is unusual because its historical interest has never faded away to the pages of history books. Although its existence dates back millions of years, and although it has taken its place in the history of the Indians, the Spaniards and the settlers, Enchanted Rock is nevertheless taking its place in the history of the people of today. For the rock has the same mysterious appeal to modern-day visitors that it had many years ago when it served as a landmark on the trail.

Construction of the new 7.77-mile R.M. 965 past Enchanted Rock was begun in October, and is expected to be completed by June or July. The new section begins at the north end of an already existing 18-mile stretch of R.M. 965, and runs northeast to State Highway 16. Senior Resident Engineer E. E. Pittman Jr. of Fredericksburg is the engineer in charge of the project.

Enchanted Rock is the second largest rock mountain in the United States, second only to Stone Mountain in Georgia. It rises up on the Gillespie-Llano County line in District 14. Ed Bluestein of Austin is District Engineer of District 14.

The massive rock stands about 500 feet above the surrounding plain, and its exposed granite dome covers about 640 acres. The altitude is 1,824 feet. Many adventurous individuals climb the rock, finding that what begins as an easy climb soon becomes a steep, tiring struggle toward the top. But the sturdy people who reach the top are rewarded with a breathtaking view of the surrounding plain and valleys. And there are plenty of caves and unusual formations of rocks and boulders and vegetation and wildlife to make exploring the dome top interesting.

As you come from Fredericksburg over the divide between the Pedernales and Llano River valleys, Enchanted Rock

is visible for many miles in all directions . . . which explains why it was such an important landmark to early day Indians, the Spanish missionaries and treasure hunters, the surveyors, the trail blazers, and the first settlers.

Enchanted Rock lay on the Pinta Trail, one of the oldest trails in the state, perhaps even older than the Old Spanish Trail. The Indians used this route in traveling from the Northern Plains to central and southern Texas. Spanish groups, surveyors and settlers also used the trail as early as 1700.

The Pinta Trail for a distance followed the route of the old SAAP Railroad, going from San Antonio to Boerne, near Waring, into the Bankersmith community in Gillespie County, and through the pass at Cain City. At the Pinta Trail Crossing of the Pedernales River, it branched in two directions, one trail leading to Fredericksburg and along the general direction of the present U.S. 87 (Mason Highway). The Upper California Road and Upper Emigrant Road followed the Pinta Trail in this direction.

The main Indian trail, however, led in the direction of Bear Mountain and more or less followed the route taken by the Upper Crabapple Road, R.M. 965, into Crabapple Canyon, across Sandy Creek at Enchanted Rock, and then in a northwesterly direction to where it merged with the other trail near Comanche Creek south of Mason.

The Indians named Enchanted Rock. They believed that it was indeed "enchanted" and that spirits dwelt there. Consequently, the Indians held the rock in great awe and considered it a holy place. However, some Indians would not set foot upon the rock, thus making it a refuge for white men fleeing the Indians. Yet other Indians had no qualms about treading the rock; they climbed to the summit to offer human sacrifices. Still other Indians used the rock as a rallying point.

Early folklore includes accounts of "spirit fires" and "noises" on Enchanted Rock. The reflection of moonlight in the small pools of rainwater in shallow depressions on the rock, or the large pink crystals of microcline or bits of mica which glistened in the sun, are the scientific explanation of these lights. And the noises were caused by the expansion and contraction of granite as it cooled at night after a hot day.

Such oddities of nature no doubt saved many a life, because not only would the Indians refuse to attack white men who climbed the rock, they also would not shoot any arrows toward the rock.

One white man who sought refuge on Enchanted Rock and was victorious in his encounter with the Indians was John Coffee Hays. His bout with the Indians was considered of such importance that in 1936 the State placed a bronze plaque on Enchanted Rock with this inscription:

"From its summit in the fall of 1841, Capt. John C. Hays, while surrounded

With no fear of an Indian attack, several District 14 men begin taking level readings for construction of a new section of R.M. 965 past Enchanted Rock. Years ago Indians in the area were especially hostile to surveyors, leading to the saying that in marking a tree, a surveyor would cut once and look around twice for Indians. From left to right, the men are Charles J. Lange, Assistant Resident Engineer; E. E. Pittman Jr., Senior Resident Engineer; and Alois O. Baumann, Inspector III.

by Comanche Indians who cut him off from his ranging company, repulsed the whole band and inflicted upon them such heavy losses that they fled."

Although Hays lived in Texas only 11 years (moving on to the California Gold Rush and later becoming Surveyor General of California), he left many stories behind about his adventures as an Indian scout, surveyor, soldier and Texas Ranger.

He came to Texas from Mississippi and joined the Texas army just after the battle of San Jacinto. When the Texas Rangers were organized in 1840, Hays, then 23, was appointed to their command. By the time of the Mexican War he was a colonel.

However, when Hays was not busy serving as a spy or scout in the army or as a Ranger, he worked as a surveyor. And here lies an interesting comparison between the work done today by Texas Highway Department surveyors and the work of pioneer surveyors.

Surveying land on the Texas frontier was dangerous work. Records indicate that the larger portion of the surveyors were killed during the first year after the General Land Office was opened. There was no precision equipment, and the men had to be on the watch for hostile Indians constantly.

Many of Hays' surveying trips were into Gillespie County, where he surveyed almost all of the choice tracts along the Pedernales, including the 23,040 acres near Morris Ranch, and in the sought-after mineral region around Enchanted Rock.

Accompanying the surveyor usually was a party of five—two chain carriers, a rod man, a cook, and an Indian lookout. The two chain carriers used steel chains, 10 varas in length although some were 20 varas long. The vara is a Spanish measurement still used in surveying land, and is equivalent to 33⅓ inches.

Each man had two horses, one to ride and the other to pack equipment, such as food supplies, maps, field books, compass and a Jacob's staff.

The Jacob's staff was a four-foot high hardwood rod with a copper shoe or spike which tapered off to a sharp steel point. It was topped with a copper head which fit into the socket of the compass. Hays did not always use his staff, but often carried the compass on his back and when he took his "sighting" he would place the compass on the saddle horn of his Spanish saddle and take his reading from there.

One of the reasons the Indians hated the surveyors so much was their belief that the compass was the device which 'stole" their land. They felt land was to be used and should not belong to anyone, and they saw in the compass something which the white man used to lay claim to the land to the exclusion of all others. For this reason the Indians were usually after the surveyor, which led to the old saying that the surveyor, in marking a tree, would cut once and look around twice for Indians.

For many years during the latter part of the 1800's, a church service was led annually on top of Enchanted Rock by the Rev. Dan Moore. The worshippers rode their horses or walked to the summit to hear his sermon based on the text, "Upon this rock I will build my church." Matt. 16:18. ■

SOMETHING DIFFERENT IN HEADWALLS

New standard design requirements in District 15 for headwalls on pipe culverts call for only slot type of excavation, plus a single header form and simple perimeter forms.

Walter E. Ehlers, Senior Resident Engineer
Boerne, District 15

Recent installations of a new type of headwall construction for pipe culverts in Kendall County are proving highly successful in operation and in simplicity of construction.

Adaptability is one of the most pleasing features of the new concrete headwall construction, Class "B" type. A standard design, prepared by the Bridge Design Section of District 15, may be used without change in all normal culvert installations, and in skew installations up to 45 degrees. Such a standard design virtually will eliminate the preparation of special structure details for each project, as has been required in the past.

The design is not only standard, it's much simpler, too. Other plus factors include a high efficiency of operation, good embankment protection and a more pleasing overall appearance.

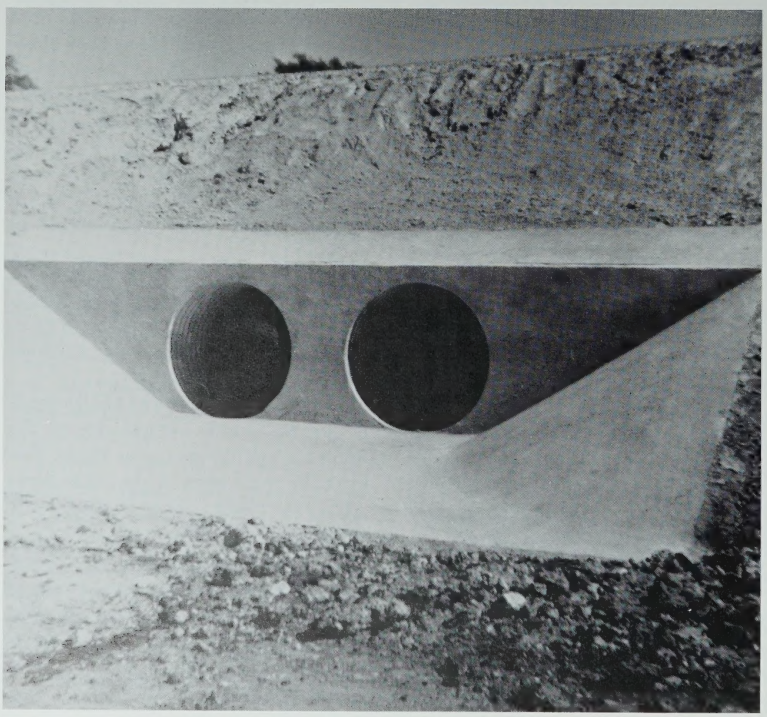
The only forms required are the header for the outside vertical face of the headwall, and the perimeter forms. Fastened by heavy wire to the pipes themselves, the header form is temporarily braced from the outside.

This new design also eliminates waste of extra pipe left protruding, or cut to conform to the slope as found in other types of headwall construction. The perfect fit of the headwall into the slope allows easy cutting and blading of grass.

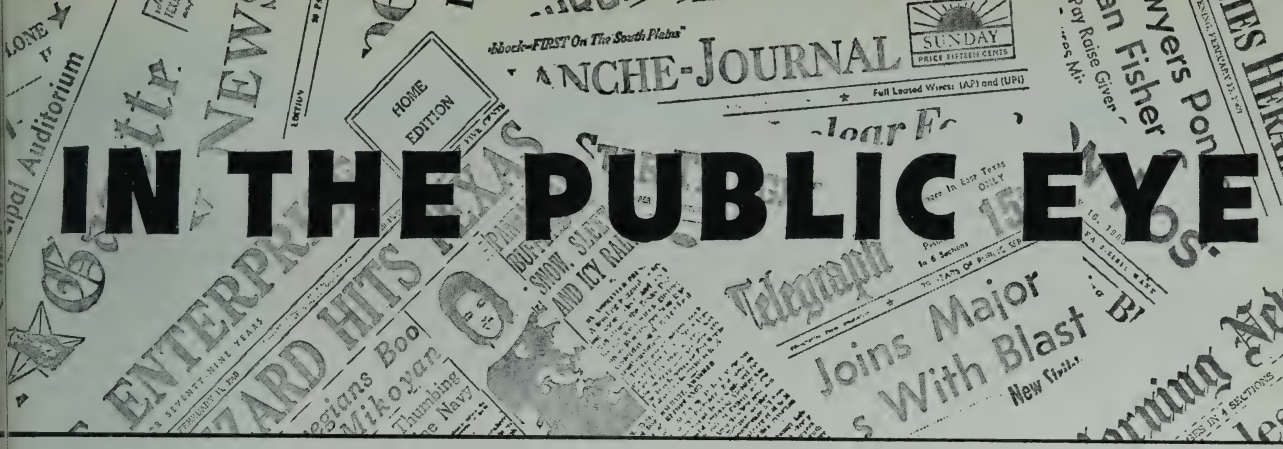
The vertical headwall is poured with the single-piece header form tied directly to the pipes and braced from behind. Other concrete is poured and floated directly on the prepared slope, with only perimeter forms required.

On an overflow section, the apron can be tied into a stabilized base course. Further, the standard design provides pre-calculated quantities of extra materials per foot if it is necessary to extend the riprap protection higher up an embankment.

This new design, first used on a single installation on FM 1283 in Bandera County, was employed exclusively on the last three Farm-to-Market projects in Kendall County. Thus far, four separate contractors have constructed this new type of headwall, and all comments have been favorable. ■



The finished product — efficient, eye-pleasing and adaptable to almost every slope and angle from the new standard design in District 15.



Texas Interstate System

Dallas Morning News, with praise — "Not a single instance of fraud or graft has been found in the building of more than $52,000,000 worth of expressways in the Dallas area since Congress ordered the Interstate Highway System in 1956.

"Texas not only has moved faster than any other state in building its part of this national system; its work is free of the corruption which in at least three other states reached the stage of public scandal.

"In some two-party states there have been frustrating delays, due to partisan fights between Democrats and Republicans struggling for control of their state government.

"Texas, fortunately, has put highway construction into the hands of an excellent engineer—Dewitt Greer—and has not subjected him to a political tug-of-war. Politicians struggling for party power can't build highways. Left alone, engineers like Greer can."

Expensive Housecleaning

Corpus Christi Caller, frowning at litterbugs—"The people of Texas and some of our visitors are literally throwing away $1.4 million a year. That's what it cost the State Highway Department last year to clean up the state's highways.

"That's expensive housekeeping . . .

"The Highway Department announced it has adopted a cartoon character to be called the 'Litter Longhorn' to help with the problem. It might help. Smoky the Bear has become quite a well known cartoon character used by the federal government to educate our citizens about the dangers of forest fires.

" . . . We hope Litter. Longhorn will come to mean something to those of us who would carelessly toss paper, beer cans, half-eaten sandwiches and the like onto the highway. But we are not optimistic. It's shameful to 'throw away' $1.4 million a year. But only you can stop it."

Makin' History

Kilgore Daily News Herald, reporting — "Actual construction on the largest highway project in Harrison County's history, the proposed new U.S. 59 and third section of Interstate 20, got under way this week when contractors moved equipment into the area.

"Actual cost of the 10.61-mile construction project is expected to be almost $3 million . . . "

Short Cut

Fort Worth Press, announcing — "The Texas Highway Department will build a 22-mile highway to give motorists a new short-cut route between Mineral Wells and Graham.

"Engineers said the road would branch from Highway 180 between Mineral Wells and the Brazos. It will run north to State Highway 254, which leads into Graham."

Sounds of Progress

Edgewood Enterprise, noting — "In Van Zandt County, in all of East Texas, throughout the entire state, the rattle and clank of heavy earth-moving equipment bespeaks the fact that Texas is continually improving existing highways and constructing new ones.

"Now under construction in the eight-county District 10, which includes Van Zandt, or planned for building during the next 12 months are highway projects calling for expenditure of more than $15\frac{1}{2}$ million.

"Projects under construction in the area call for a total of $5,450,923. Bids are expected to be let during the next year for proposed road construction expected to cost an additional $10,065,000."

A Traveler's Joy

Houston Press, in George Carmack's column—"And now another travel item —for which the Texas Highway Department is to be commended.

"The department has announced that the largest and finest roadside parks ever built in Texas will be located along the new Interstate Highway System.

"These new roadside parks are actually major rest areas and if the first one completed—just east of San Antonio on Interstate 10—is a sample, these will make a real addition to the joys of highway travel in Texas.

Tremendous

Athens Daily Review, editorially — "Henderson and Navarro counties are being offered an opportunity that every county that lies on Texas Highway 31 wishes were theirs. The Texas Highway Department has submitted common papers to the commissioners courts of both counties which, when approved, will be the initial step that will eventually culminate in the construction of a four-lane highway from Waco to I.H. 20 at a point between Kilgore and Longview.

"This is a tremendous opportunity. . . ."

Giant Step in

A bold and forward step was taken by the Texas Highway Commission in November with approval of the largest work program in the history of the Highway Department.

The program covers new work on the Interstate and Defense Highway System in Texas. It was approved at the regular meeting of the Commission November 22.

This unprecedented action will enable the Texas Highway Department to secure all of the remaining right of way on the 3,033 mile Interstate Highway System as well as to cover construction costs on an additional 1,306 miles.

Long range programming such as this new action has been an established policy of the Department and has enabled Texas to build more miles of Interstate Highways than any other state. This program will go a long way toward insuring that Texas will maintain that lead and can complete construction on the Interstate System by 1972, the construction deadline established by the National Congress.

Commission Chairman Herbert C. Petry Jr. hailed the action as tremendously significant in terms of economy, safety and progress.

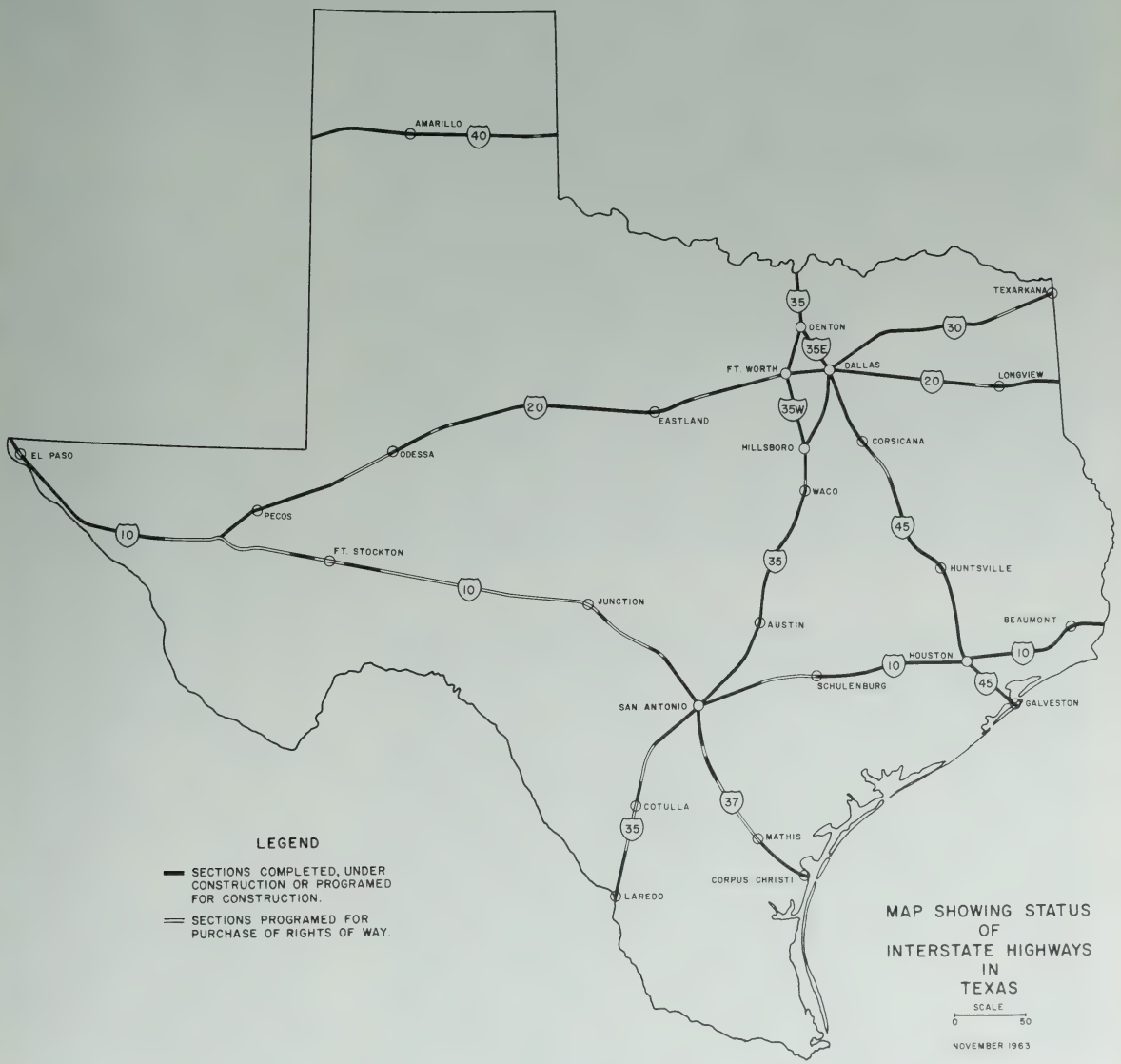
"Long range programming enables our contractors and our engineers to see exactly where we are going," he said, "and make their plans accordingly. The assurance of a steady flow of well planned work results in lower bids on highway work, saving taxpayers money."

Action by the Commission was taken after careful study by the staff of the Department to insure that a well balanced program is authorized. Aim of the Commission is to effect a program of material economic benefit throughout the state, well balanced between urban and rural needs.

Chairman Petry pointed out that safety experts estimate a life per year is saved for each eight miles of Interstate Highway constructed.

"In terms of safety and convenience," Petry said, "there is no way to estimate the ultimate worth of the Interstate Highway System in Texas. This program simply assures Texas that it will move forward as rapidly as possible to secure its shares of the tremendous benefits." ■

Interstate Progress



other voices

the new, the novel, the unique in highways

Bridge Engineers Build a Globe

Bridge engineers of the U.S. Steel Corp. met some unusual challenges in the construction of a 350-ton, 140-foot tall Unisphere, a stainless steel globe which will become the permanent symbol of the World's Fair. The globe will become a monument in the World's Fair park in New York City.

The 120-foot-diameter open globe, with meridians, latitudes, and continents, posed many problems. For men accustomed to working with horizontal and vertical steel, the curving members of the sphere proved to be difficult to erect and hard to scaffold. Layout and erection were further complicated by the 23½-degree tilt of the globe's axis. And special short arc-welding methods had to be used to prevent distortion and discoloration of the steel.

Since this was the first globe of its size ever built, there was no backlog of information to fall back on. The design called for an open sphere; no internal or cross bracing could be used between the meridians and latitudes. The rigid-frame design had to be strong enough to support the sphere and resist wind loads. In the structural calculations, more than 1,500 unknown forces were involved in the determination of unit stresses so that steel could be used to its maximum. An electronic computer made short work of solving 670 simultaneous equations involved in one of the problems.

The big ball was built in two sections —the lower half first, then the upper half. Meridian members for the lower half were welded together from two separate pieces. The meridians were then placed in a jig for assembling 30-degree sections. Here, the tubular parallels were welded to the three meridian members to build the section. Extreme care had to be taken in fabrication to insure that the members would fit perfectly into the sphere. Because of their irregular shape, handling the 20 to 32-ton sections with a pair of cranes was a ticklish business.

Photo and story courtesy of Contractors & Engineers Magazine

Stop Anyway

A portable stop sign has been developed in Florida. When a stop sign has been knocked down or damaged beyond immediate repair, the portable sign is set up until a permanent repair installation can be made.

The device is constructed of a concrete-weighted iron base with a threaded socket, a five-foot three-inch diameter steel post, and a standard stop sign with U brackets. Cost: $15.

A New Census

In April a button was pushed to start a new kind of census, reports a feature in **The Highway User.** The census is a counting of the vehicles by which Americans travel and transport.

Dr. Donald E. Church, chief of the Transportation Division of the Bureau of the Census, is heading the $2 million operation. The census was authorized by Congress as a measure that will serve the country in both war and peace.

The census is organized in four broad programs. The first was a National Travel Survey begun earlier in the year. It involved sampling 6,000 households to find out everything about the selected persons' travel . . . how many trips, for what reasons, how long, how many in the family went, where they stayed, and by what kind of vehicle did they travel. This type of information is useful to such groups as hotels, motels, trains, car manufacturers, bus operators, air lines, and highway departments, to name a few.

The second project was the Truck Inventory and Use Survey, in three stages. Mailings were made to some 100,000 truck owners and determine such things as the type of fuel used, number and arrangement of axles on the power and trailing units, the type and length of body, mileage data, weekly hours spent on maintenance, and the distance and purpose of individual trips for which the vehicle is used. State records are used

to obtain information as to make, year, model, gross vehicle weight or other size details.

The fourth and final part of the census is the commodity transportation survey, the most complicated part of the census. It was begun the first of January, with its main objective to measure traffic flow, especially with respect to the relative volume of commodities shipped, the means by which they are shipped, origin and destination, and size of shipments.

The final report of the entire survey will be made sometime later in 1964.

Finland's First

Finland's first motorway has been officially inaugurated. It stretches over nine miles on the Helsinki-Turku route and is part of European Road E-80. Construction lasted six years because of unfavorable soil.

Bigger and Heavier

The American Association of State Highway Officials has adopted its first new policy on truck sizes and weights since 1946.

The new AASHO size and weight code, which will serve as a recommended guide to the states, is as follows:

Single Axle Weight—Raised from 18,000 to 20,000 pounds.

Tandem Axle Weight—Remains unchanged at 32,000 pounds.

Maximum Allowable Width—Increased from 96 inches to 102 inches (excluding safety devices) where justified by the width of highway lanes.

Height—Raised from 12.5 feet to 13.5 feet.

Single Unit Length—Boosted from 35 feet to 40 feet.

Tractor-Semitrailer Combination Length—Increased from 50 to 55 feet.

Other Combinations Length—Increased from 60 to 65 feet.

A new gross weight table to apply to all vehicles and vehicle combinations also was recommended, and will be released in the near future. Because of revised allowable weights and greater lengths for combinations, the maximum gross weight recommended for any combination reportedly is between 88,000 and 90,000 pounds. This compares with the present figure of 73,280 pounds.

Photo courtesy Oregon Highway Department

RUGGED AND SCENIC

One of the most difficult two-lane highway projects ever undertaken in the U.S. hugs the rugged Oregon coast. The 15-mile highway runs between Gold Beach and Brookings. It was built at a cost of some $11.1 million. Enormous cuts and giant fills are found throughout the route.

Women Drivers

Take it from two sociology professors, the Woman Driver of caricature is real and dangerous, comments the Milwaukee (Wis.) Journal editorially.

A study at Northwestern University showed that basically the Woman Driver is unskilled . . . overcautious . . . oblivious to other drivers . . . fickle when it comes to signaling . . . and numerous other uncomplimentary things.

How can this Woman Driver be eliminated? By requiring drivers to demonstrate higher skills to get and keep drivers licenses, advises the report.

Aid for the Relocated

During the past 10 years, the California Department of Public Works' Highway Right-of-Way Division has relocated 115,000 persons whose properties have been purchased for freeway rights of way and other public uses.

The program was established to compensate and relocate people, especially elderly persons, to help reduce the unavoidable traumas they encounter when displaced by public progress.

Pictures of Progress: I.H.

Along a roûte of approximately 2.7 miles through the heart of downtown Dallas, work is proceeding on six active projects as part of the massive and complex expressway portion of Interstate 20.

From Industrial Boulevard to Haskell Avenue, all contracts have been awarded and construction is underway. When completed, this portion of I. H. 20 will, by grade separations, sweep over or under eight railroad networks of 28 or more tracks and flow through three major interchanges. B. L. DeBerry, District Engineer of District 18 at Dallas, has supplied the pictures of progress you see on these pages.

With the Dallas skyline
in the western background, workmen
on the Chestnut Avenue bridge
set up forms
to support the lightweight
concrete bridge slab.

20 Expressway in Dallas

Concrete retaining walls on portions of depressed roadways of I.H. 20 through Dallas feature corrugated designs on their faces. Engineers developed these corrugations to break the towering height of the walls, and to help prevent a feeling of being enclosed by the motorists operating near them.

Looking northeast, an aerial view displays the graffic beauty of I.H. 20 as it takes shape through Dallas. At lower left, a small portion of forming for the bridge slab is in position. Structural steel extends two blocks. Columns with caps march around the curve, and unadorned columns sprout in the distance.

A view of the work in progress on the top level of the three-level Pearl-Preston Street Interchange shows the thin-sectioned concrete piers which will support the roadway. In the background, workmen are placing forms and reinforcing steel for the deck. The freeways and second level of roadways will pass beneath these structures.

The steel is in position on long bent caps and welding is in progress. The view is looking east at the intersection of Baylor and Hickory streets.

Another view of the Pearl-Preston Street structures shows approximately 60 per cent completion. The Pearl Street underpass is in the foreground. The depressed east-bound freeway will underpass at a point not shown in this picture, below and to the left. Closely spaced double piers are used at ends of continuous units. Fixed uplift-type bearings are employed at all interior piers.

Workmen position shoes which will support steel beams on completed bents. View is looking west from near the Santa Fe Railroad yards on a portion of I.H. 20, Dallas County.

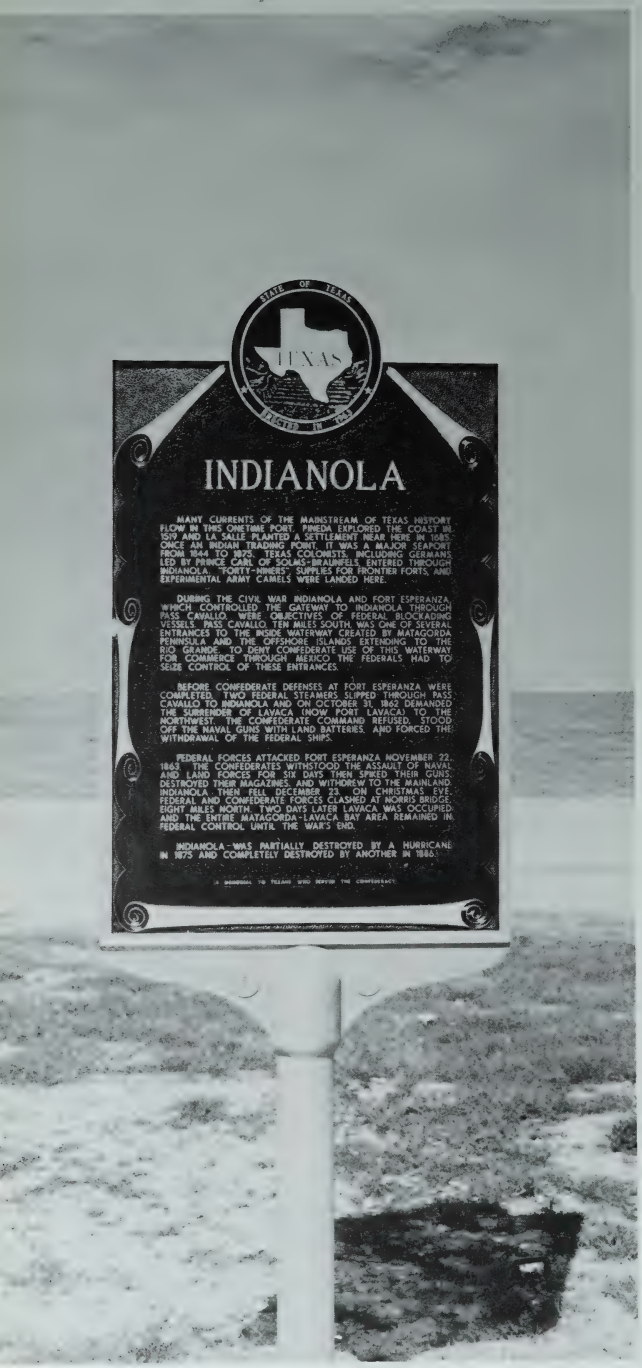
Approximately 75 per cent completed is the Union Terminal Railroad Underpass on I.H. 20, upper center. Excavation and concrete work is underway on the final section of this underpass, and railroad "shoo-fly" tracks are already in operation. When finished, this structure will carry 18 tracks of rail traffic over I.H. 20.

In deep sections of the deck slab on the Pearl-Preston Street structure, these laminated tubular fibre forms were laid in three lines. The hollow cylinders measure 36 inches in diameter, and by displacing low-working concrete, reduce the weight of the structure and overall cost.

INDIANOLA

THE GHOST

Earl F. Wyatt
Supervising Maintenance Engineer
Yoakum, District 13


STATE OF TEXAS
TEXAS
ERECTED IN 1963
INDIANOLA
MANY CURRENTS OF THE MAINSTREAM OF TEXAS HISTORY FLOW IN TIMES ONETIME PORT. PINEDA EXPLORED THE COAST IN 1519 AND LA SALLE PLANTED A SETTLEMENT NEAR HERE IN 1685. ONCE AN INDIAN TRADING POINT, IT WAS A MAJOR SEAPORT FROM 1844 TO 1870. TEXAS COLONISTS, INCLUDING GERMANS LED BY PRINCE CARL OF SOLMS-BRAUNFELS, ENTERED THROUGH INDIANOLA. "FORTY-NINERS" SUPPLIES FOR FRONTIER FORTS, AND EXPERIMENTAL ARMY CAMELS WERE LANDED HERE.
DURING THE CIVIL WAR INDIANOLA AND FORT ESPERANZA WHICH CONTROLLED THE GATEWAY TO INDIANOLA THROUGH PASS CAVALLO, WERE OBJECTIVES OF FEDERAL BLOCKADING VESSELS. PASS CAVALLO, TEN MILES SOUTH, WAS ONE OF SEVERAL ENTRANCES TO THE INSIDE WATERWAY CREATED BY MATAGORDA PENINSULA AND THE OFFSHORE ISLANDS EXTENDING TO THE RIO GRANDE. TO DENY CONFEDERATE USE OF THIS WATERWAY FOR COMMERCE THROUGH MEXICO THE FEDERALS HAD TO SEIZE CONTROL OF THESE ENTRANCES.
BEFORE CONFEDERATE DEFENSES AT FORT ESPERANZA WERE COMPLETED, TWO FEDERAL STEAMERS SLIPPED THROUGH PASS CAVALLO TO INDIANOLA AND ON OCTOBER 31, 1862 DEMANDED THE SURRENDER OF LAVACA (NOW PORT LAVACA) TO THE NORTHWEST. THE CONFEDERATE COMMAND REFUSED, STOOD OFF THE NAVAL GUNS WITH LAND BATTERIES, AND FORCED THE WITHDRAWAL OF THE FEDERAL SHIPS.
FEDERAL FORCES ATTACKED FORT ESPERANZA NOVEMBER 22, 1863. THE CONFEDERATES WITHSTOOD THE ASSAULT OF NAVAL AND LAND FORCES FOR SIX DAYS THEN SPIKED THEIR GUNS, DESTROYED THEIR MAGAZINES, AND WITHDREW TO THE MAINLAND. INDIANOLA THEN FELL DECEMBER 23. ON CHRISTMAS EVE FEDERAL AND CONFEDERATE FORCES CLASHED AT MORRIS BRIDGE EIGHT MILES NORTH. TWO DAYS LATER LAVACA WAS OCCUPIED AND THE ENTIRE MATAGORDA-LAVACA BAY AREA REMAINED IN FEDERAL CONTROL UNTIL THE WAR'S END.
INDIANOLA WAS PARTIALLY DESTROYED BY A HURRICANE IN 1875 AND COMPLETELY DESTROYED BY ANOTHER IN 1886.
A MEMORIAL TO TEXANS WHO SERVED THE CONFEDERACY

While there are many spots in Texas where the spectre of "what once was" hangs heavily, the white sandy beach at Indianola is the grave of the 1870's "Queen City of the West." This beautiful spot with its natural Powderhorn Lake harbor was once considered the finest harbor in the Gulf of Mexico.

From a tent city of European immigrants, called Indian Point or Powderhorn in the 1840s, this port, renamed Indianola, grew lustily despite plagues of cholera and yellow fever; Civil War shellings, capture and recapture; the hurricane of 1866; and a devasting fire in 1867. In 1856, the United States

As a member agency of the Texas Tourist Marker Committee, the Texas Highway Department has selected sites to commemorate scenic, historic, and recreational points of interest in Texas. Other agencies on the committee are the Texas State Historical Survey Committee, the Game and Fish Commission, and the State Parks Board— the latter two now merged and identified officially as the Parks and Wildlife Department. The Indianola Tourist Marker was erected this past June by the Texas State Historical Survey Committee.

Only ruins mark where the port of Indianola once stood. Pictured on this page are the ruins of old rain cisterns used for storing fresh water. An interesting note is that Hurricane Carla of 1961 also hit the site where Indianola had been struck by hurricanes in 1875 and again in 1886.

PORT

Army landed several boat loads of camels at Indianola for a unique but unsuccessful experiment in overland transportation. By 1875, she boasted several long piers for ocean going vessels including sidewheelers, a railroad extending out on one half-mile pier, many shell-concrete buildings including the three-story Hotel Cassimire, a courthouse, and a customs house.

Then on September 17, 1875, the sea which had created Indianola and nourished her growth, turned on her and left a scene of death and destruction. The hurricane struck without warning on a hot, still day with wind and tides that crushed buildings, piers, cattle, and humans with its savage force, killing an estimated 900 people.

But Indianola wasn't dead. Her survivors and investors started building back and, by 1886, she was again a promising seaport when the sea delivered a death blow. A severe hurricane struck on August 20, and the port of Indianola was demolished.

Today, the visitor to Indianola can see the grim reminders of her history. Besides the cemetery with its tombstones carrying the names of the Austrian, English, German, Irish, French, and other immigrants who perished, there are the old rain cisterns used for storing fresh water and a few ruins of handmade shell-concrete bricks. A monument and a new historical marker tell the condensed, impersonal story of Indianola.

But even for the visitor who doesn't find an old coin or bottle, or rusty key, or fragment of fine chinaware, it's not hard to see the ghost of the once proud seaport. ■

For Smoother Pavement

S. R. Busby, Assistant District Engineer
and
J. T. Martin, District Construction Engineer
Pharr, District 21

In an effort to correct a rough textured surface on an otherwise smooth pavement of rock asphalt, District 21 applied its first slurry seal coat over 40 miles of U.S. 281 during August and September of 1963.

That area of U.S. 281 consists of rock asphalt over concrete, and a high type flexible base. Strength of the existing base was judged adequate, and the asphaltic surface was in excellent condition except for raveling out of fine material between the coarse aggregate, creating what one contractor aptly called "a popcorn surface." The usual type of seal coats in which asphalt is applied and then covered with aggregate leaves much to be desired in correcting such a situation.

This portion of U.S. 281 carries 2,000 to 3,000 vehicles a day, a large percentage of which is heavy trucks. The slurry seal coat was applied from a point at the Brooks-Jim Wells county line, north of Falfurrias, and extending south to approximately seven miles south of the Hidalgo-Brooks county line. Contractor was Young Brothers of Waco.

The slurry seal coat developed for use in District 21 was the result of study of other similar coatings in various parts of the state and nation. In 1959 the U.S. Navy placed a slurry seal coat on the runways of the Kingsville Naval Air Station. The Navy, realizing that possible raveling would be very detrimental to high speed landing and take off of jet aircraft, placed the slurry seal over an excellent hot mix pavement of the runways. The work was observed at the time by District 21 personnel, and inspected again this year. After four years of use, it was, in general, found to be in excellent condition.

Reports were studied of the California Highway Department, which has been experimenting with slurry seals since 1952. Additional data was secured from

This photograph, with pocket knife for size comparison, shows "popcorn" texture of pavement surface (right), and newly applied slurry seal coat (left). The highway is U.S. 281 in District 21.

other Texas Highway Department districts, and recent slurry seals applied in Corpus Christi were observed and investigated. Based on all this information, District 21 set up its own plans and specifications for the 40-mile slurry seal project. In general, they were as follows:

1. The use of rock asphalt dust was specified, practically all of which passed the No. 8 sieve, and a minimum of five per cent passing the No. 200 sieve. (The bulk of this material passed the No. 16 sieve.) The requirement for a minimum of five per cent passing the No. 200 sieve was especially emphasized by the California reports, to prevent coarser material from settling out, leaving a non-uniform asphalt content.

2. The emulsified asphalt should be manufactured of a harder grade asphalt than usually used, and emulsion with a residual asphalt of from 40 to 100 penetration was specified. The plans call this Asphalt EA-HVMS Modified, but the modifications and field changes resulted in a special emulsion entirely different from any in the standard specification book.

3. From observations at the Kingsville Naval Air Station and in Corpus Christi, it was decided that about 10 per cent of residual asphalt by weight should be added to the aggregate. This resulted in using 36 gallons of emulsified asphalt per dry ton of aggregate. This rate makes some allowance for the natural coating of asphalt on the particles of limestone rock asphalt.

4. Water in the slurry was controlled visually to produce a thin slurry of proper laying consistency.

5. Specifications required that the surface be thoroughly washed with water and then sprinkled immediately ahead of the application in order to eliminate all dust and provide a damp surface upon which to place the slurry.

6. The application of a scat tack coat was provided for, but was found unnecessary during construction, and was eliminated. The scat tack coat would also have been undesirable because it would have flowed out on the paved shoulders, staining them.

7. The project was let on the basis of an estimated requirement of 10 pounds of aggregate per square yard. It was estimated that such a quantity would cover the large aggregate to about 1/16-inch, and fill all voids between the large aggregate. On the job, it was found that a maximum of about six pounds of aggregate per square yard could be placed.

Spray bars under front bumper and in front of trailing squeegee box sprinkle pavement before application of slurry.

On the first few runs, emulsified asphalt rates as high as 65 gallons per ton of aggregate were inadvertently used. Adjustments were made after the first few days to approach more closely the specified rate of 36 gallons of emulsion per ton of aggregate. Such a rate appears to be the desirable one. A rate of 60 gallons per ton seems to produce a surface on the verge of "bleeding."

We also found it necessary to rescreen the material to eliminate lumps and stray particles of gravel or other oversize aggregate. The continuous type machine which was used worked very well, but we believe that a vibrator should probably be added to the aggregate bin to secure more uniform rate of flow through the feeder gate. Rescreening of the aggregate was vital, and coarse screening of the slurry before it entered the squeegee box was also necessary. Since this was an experimental job, we required that the aggregate be weighed, but it appears that the material could

Forty miles of U.S. 281 in Brooks, Jim Wells and Hidalgo counties were sheathed with a slurry seal coat applied in this manner.

This shows squeegee box and consistency of the slurry. Note spray nozzles under platform at far left. Coarse screen removes lumps in slurry as it is fed into squeegee box.

Though pavement has been cleaned prior to application of slurry, care must be exercised to remove large aggregate thrown onto surface thereafter by traffic traveling on shoulder. Such pieces of aggregate are causing streaks noted here in slurry application.

be measured by volume with equal success.

This slurry seal application resulted in a very uniform surface, and appears to have accomplished our purpose. It is our observation that such a slurry seal coat should not be expected to do any leveling up, nor should it be expected to restore a weak, cracked surface. Our only purpose was to restore a smooth texture to an otherwise good, smooth pavement. Based upon the application of six pounds of aggregate per square yard, the cost of this work was slightly over six cents per square yard.

In addition to 40 miles of seal coat on U.S. 281, a short experimental section was placed in Falfurrias on F.M. 2191, over both a hot mix pavement and a two course surface treatment. Both these surfaces were showing signs of raveling. Two other short experimental sections were placed on the east bound frontage road of U.S. 83 Expressway opposite the District office in Pharr.

The hot mix pavement section on F.M. 2191 in Falfurrias was very dusty, and in some places near the gutter there were considerable quantities of sand. Though the pavement was broomed and washed with water, a number of small areas peeled off after application of the slurry. It is apparent that great pains must be taken to remove all dust and sand from a pavement surface, or the slurry will not adhere. A requirement for a high-pressure spray truck to thoroughly wash the pavement with water would be advantageous.

If the 40-mile slurry seal coat on U.S. 281 holds up well, we expect to use this method in our 1964 Improvement Program to restore smooth textures to both asphaltic pavements and asphalt surface treatments throughout the District. This method will be used only where the base and surfacing is in good condition except for incipient raveling.

Specifications for the emulsified asphalt and the required gradation of the aggregate are given below. The emulsified asphalt was a low viscosity asphalt containing a minimum of 60 per cent residual asphalt of a very high ductility. The material was apparently very stable. ■

From the rear window of a car, this view of U.S. 281 shows completed slurry seal coat. Paved shoulders did not receive coat of slurry seal.

EMULSIFIED ASPHALT USED FOR SLURRY SEAL COAT MIXTURE

	SPECIFICATION MIN.	SPECIFICATION MAX.	TYPICAL TEST RESULT
Furol Viscosity at 77°F, Sec.	20	50	43
Residue by Distillation, %	60	—	62
Oil Portion of Distillate, %	—	—	Trace
Sieve Test, %	—	0.05	0.05
Demulsibility 35 cc of N/50 $CaCl_2$ %	—	30	0
Settlement, 5 days, %	—	3.0	1.7
Tests on Residue:			
Penetration at 77°F, 100g, 5 sec.	40	100	58
Solubility in CCl_4, %	97.5	—	99.7
Ductility at 77°F, 5 cm/min, cm	40	—	141+

GRADATION OF AGGREGATE

SIEVE SIZE	PER CENT RETAINED
No. 4	0
No. 8	0 — 2
No. 16	10 — 40
No. 30	35 — 60
No. 50	50 — 80
No. 100	70 — 90
No. 200	85 — 95

To and From Our Readers

Sympathy From Afar

The impact President Kennedy's death made upon the world has touched the Texas Highway Department. A letter was received from *Etudes Routieres*, a Swiss magazine with which the Highway Department exchanges publications. This is the letter:

"The October issue of *Texas Highways* and your letter of November 4 (requesting a picture) arrived on the very day of the tragic end of President Kennedy. All of us here at *Etudes Routieres* have been deeply stunned, shocked and shaken, and we want to tell you that we are profoundly grieved.

"With our sincere sympathy . . . "

The letter was signed by Victor Azam, editor of the magazine.

Recruiting Under Way

The Highway Department has started a new program of recruiting civil engineering graduates of Texas colleges.

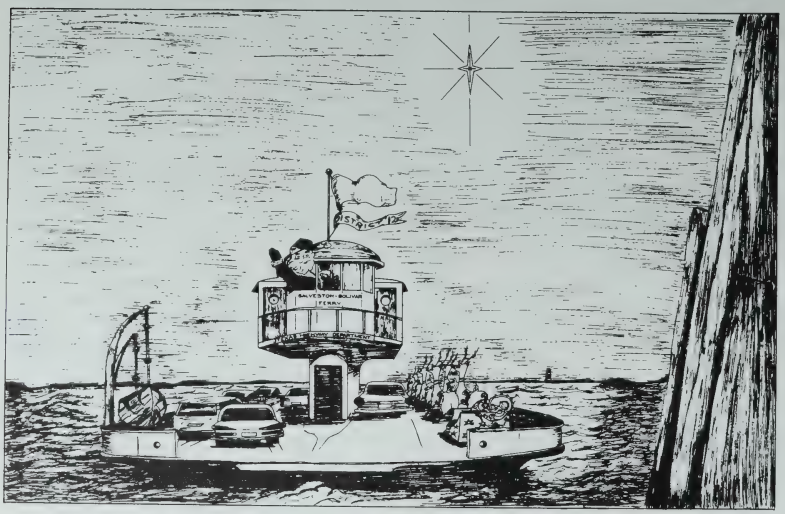
A committee has been named to correspond with and to visit students at designated schools. They are:

Oscar Crain, District Engineer, Lubbock, and R. S. Williamson, Highway Design Division, Austin, *Texas Tech;* B. L. DeBerry, District Engineer, and Oliver Rayner, District Construction Engineer, Dallas, *S.M.U.;* C. B. Thames, District Engineer, Bryan, and W. W. Potter, District Engineer, Tyler, *A&M;* T. S. Huff, Chief Engineer of Highway Design, Clyde Silvus, Bridge Engineer, and M. D. Shelby, Highway Design Division, Austin, *University of Texas;* A. C. Kyser, Engineer-Manager, and William V. Ward, Houston Urban Office, Houston, *Rice;* W. E. Carmichael, District Engineer, Houston, and Andrew Jones, Highway Design Division, Austin, *University of Houston;* and W. E. Simmons, District Engineer, Beaumont, and William Girardeau, Bridge Division, Austin, *Lamar Tech.*

Since the program started in April, 43 graduates have been appointed.

Marking System Outlined

The Texas Highway Commission has moved to establish a uniform system of marking historical sites under a program approved by the 58th State Legislature.



Santa and the Ferry

The Travel and Information Division received Christmas cards from districts throughout the state, many of them unique in their approach to the holiday season.

We thought this one from District 12 showing Santa Claus hitching a ride on the ferry between Port Bolivar and Galveston typified that district as no other card could.

The card was drawn by William C. Freeman in the Special Services Section. Freeman was graduated from Louisiana State University with a bachelor of fine arts degree. Before graduation he worked one summer with the Louisiana Highway Department.

TEXAS HIGHWAY COMMISSION

HERBERT C. PETRY JR.	Chairman
HAL WOODWARD	Member
J. H. KULTGEN	Member
D. C. GREER	State Highway Engineer

Texas Highways

TEXAS HIGHWAYS, official journal of the Texas Highway Department, is published in the interest of highway development in Texas and for departmental education in the improvement of construction, maintenance, and operation.

TEXAS HIGHWAYS is available to the general public on a subscription basis at $3.50 annually, or it can be purchased for 35 cents a copy. Subscriptions, inquiries, material, or manuscripts should be directed to the Editorial Office, Travel and Information Division, Texas Highway Department, Austin 14, Texas.

The Commission agreed that requests for placing markers should fulfill specific stipulations to coordinate work of the Texas Highway Department with planning of the Texas State Historical Survey Committee.

Stipulations approved by the Commission:

1. Sponsors are to submit a complete description of the proposed marker and the exact inscription.

2. After a marker request is received, 90 days will be allowed for study before acceptance or rejection; another 90 days may elapse before selection and preparation of a site, if accepted.

3. No markers will honor living persons.

4. Previously marked sites will not be remarked.

5. Markers shall be furnished by the sponsors at no cost to the Texas Highway Department, and the Department will maintain the sites in keeping with the right of way in that area.

6. All marked sites must meet established standards for access and parking facilities.

Appraiser Awarded

Emmett S. Swafford, an appraiser for District 17 at Bryan, received an award from the American Institute of Real Estate Appraisers at its annual meeting held recently in New York.

The M.A.I. designation stands for Member, Appraisal Institute. Swafford qualified for the award because of his extensive training in the various fields of real estate appraising.

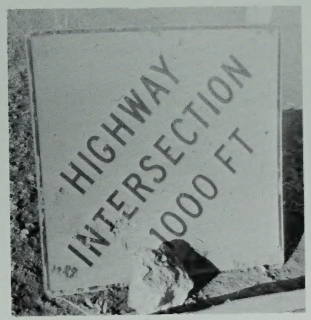
Swafford has been with the Texas Highway Department for 30 years, with the past 10 years spent at Bryan.

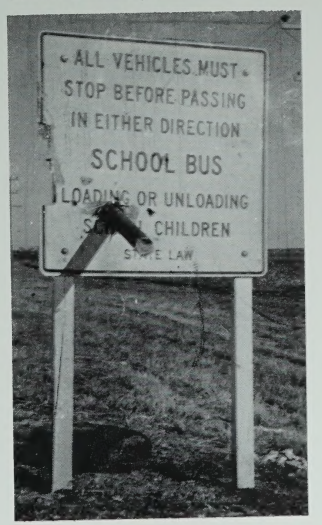
Have a Marshmallow

Recounted a man who stopped in the office to visit: "I dreamed the other night that I ate a five-pound marshmallow . . . and ever since I haven't been able to find my foam-rubber pillow."

(In case you're curious, the dreamer was cartoonist Ken Collinsworth.)

Sign Vandalism





Joel D. Willson, *Texas Highways* reporter for District 5 at Lubbock, sent in these pictures of sign vandalism. The "Highway Intersection" sign had been torn down and hit with rocks. A pipe, sharpened on one end, had been rammed through the "School Bus" sign.

However . . .

Willson also sent this letter about map dispensers:

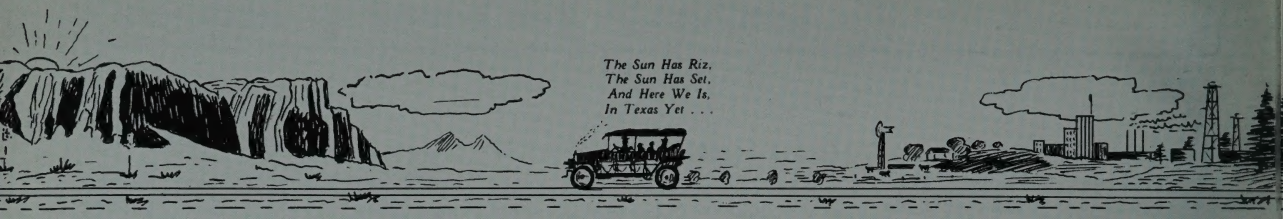
"In the November 1960 issue of *Texas Highways* we ran a picture of Eugene Munselle, Maintenance Construction Foreman at Tahoka, and his Roadside Park Map Dispenser. The next spring we equipped every roadside park in District 5 with one or more of the 'birdhouse' type dispensers, and the results, we feel, are very good so far.

"However, we still have some, or at least one, practical jokers in the world. Recently, two mouse traps—both of them set—were found inside the dispenser at the very roadside park north of Tahoka where the original map dispenser made its debut.

"We hope the person who placed the mouse traps will get caught in a bear trap some day . . . "

Back Cover

Paradise? No, it's McKittrick Canyon in the Guadalupe Mountains. Jack Lewis took the shot near U.S. 180 and 62 by Pine Springs. The canyon is known for its interesting plantlife. Besides scrub juniper cactus, the canyon also abounds with ponderosa pine and limber pine and Douglas fir trees, all of which usually are found in the New Mexico and Colorado highlands.



OVER THE HIGHWAYS

Comments . . . from the Traveling Public

• I am 11 years old and have a great interest in Texas. I would appreciate it if you could send me some information on Texas.

Texas is a wonderful state, and I love its beautiful wide-open space. Whenever I enter the state of Texas, and we're in the mountains, I drift off into the Wild West. One of my greatest interests are the Indians. I love them. I'm another Sam Houston.

Cindy Page
Los Angeles, California

• Thank you very much for sending to the Law Library of The University of Texas a copy of your new travel brochure, "Texas—Today's Funtier." It is a handsome pictorial presentation of Texas. We are glad to have it in the library.

Helen Hargrave, Librarian
Law School Library
Austin, Texas

• I have just finished reading your new promotional magazine for the good State of Texas, "Today's Funtier," and may I take this opportunity, first, to thank you for your thoughtfulness by sending me a copy and, secondly, to congratulate you on the fine job well done in the preparation and presentation of this magazine and your good state.

We of Holiday Inns of America appreciate a job like this because we know what has gone into the production of your magazine and we receive many such magazines from various parts of the country, and we believe we recognize effort when we see it.

Such a presentation will no doubt help travel in your state and it will help the travel industry in general.

Holiday Inns of America, Inc.
William B. Walton
Executive Vice President
Memphis, Tennessee

• I have a new Legion of Super heroes. His name is Superkid and he is from the planet Oysran.

His is just like Superman but some of his powers are different and the only thing that can hurt him is aranium, which is found only in solar systems away from ours. But someday it does fall to Earth.

Some of his powers different than Superman's are cold vision, superest hearing (can pick up any sound within 20 miles), can become invisible at will, can understand any language on any planet, heat vision (which is 10 times hotter than Superman's.)

Jim Tucker Jr.
Azle, Texas

• Like most typical Americans, our family has paved many roads with "good intentions." We have intended to write the Texas Highway Department each time that we ride the ferry boats from Galveston Island to Bolivar, but once home the inspiration has dissolved itself in other demanding interests.

I want to express for the Lutz family and others just like us our sincere thanks for the continued efficient service that is available to the public at the Galveston ferry and elsewhere in the state of Texas. I believe in telling the boss about the good work that a responsible person or department is doing. I am sure that the Highway Department will not object to this procedure.

William T. Lutz Jr.
Houston, Texas

• On a recent trip through West Texas, we had car trouble near Guthrie. My husband went for help, leaving our three boys and myself in the car 20 miles from any town. Your State Highway Truck No. 45555 came by and offered help, and came back about 20 minutes later to check and see if our help had come, as I had told him. I do appreciate his kindness and his nice manner, and hope you will pass along to him my sincere thanks.

Beverly Brown
Dallas, Texas

• I would like to know more about your state. Was there any forts on the land. I would like to know who got to your land first. I would like you to send me a picture of the Alamo, and the surrounding airrea. How did Texas first start out. In the Civil War was there any fitting on the land. Did the North conquer any of your land. I would like to know when Texas entered the Union.

John Johansen
Caldwell, Idaho

No, it isn't a one man seance. It's Monty McDonald, a stereo plotter operator in the Photogrammetry Section of the Design Division, plotting a contour map from aerial photographs. On a map drawn 40 feet to the inch, the plotter can obtain accuracy to within three inches on elevations.

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